

Appendix K

Cost Worksheets for the Feasibility Study

Lockheed Martin Idaho Technologies Company

INTERDEPARTMENTAL COMMUNICATION

Date: January 4, 1999

To: F. L. Webber MS 3953 6-8507

From: T. E. Sivill  MS 3655 6-9273

Subject: WASTE AREA GROUP (WAG-5) FEASIBILITY STUDY COST ESTIMATES
TES-01-99

- Reference:**
- (a) T. E. Sivill letter to F. L. Webber, TES-02-98, Waste Area Group (WAG-5) Feasibility Study Cost Estimates, August 10, 1998
 - (b) T. E. Sivill letter to F. L. Webber, TES-06-98, Waste Area Group (WAG-5) Feasibility Study Cost Estimates, August 25, 1998
 - (c) T. E. Sivill letter to F. L. Webber, TES-07-98, Waste Area Group (WAG-5) Feasibility Study Cost Estimates, September 3, 1998
 - (d) T. E. Sivill letter to F. L. Webber, TES-11-98, Waste Area Group (WAG-5) Feasibility Study Cost Estimates, October 30, 1998

Cost Estimating has provided revised Planning Cost Estimates for the project listed above. The soil sites estimate has been revised to remove the PBF-26 SPERT IV Lake Soil Site and replaced with ARA-25 Soil/Concrete Site. Soil quantities are assumed the same for ARA-25 as used for PBF-26. Costs for all soil site alternatives remain as previously estimated.

Tank sites previously included some combined alternatives for both Sites ARA-16 and ARA-02. Costs for these two sites have been segregated to reflect separate remedial action alternatives for each site. New cost estimate summary and detail sheets were generated for Site ARA-02 identifying four remedial action alternatives including: Alt. 1 No Action, Alt. 2 Limited Action, Alt 3 Removal, Ex Situ Thermal Treatment, and Disposal and Alt. 4 Stabilization and Encapsulation. Site ARA-16 Alternatives 4A and 4B have been changed to Alternatives 4 & 5 and have been modified to remove all ARA-02 costs that had previously been combined with these alternatives. Site ARA-16 Alternative 3B1 was modified to include a shared cost with WAG-1 for treatment at the Test Area North (TAN) location.

Costs have been presented for each alternative in FY 98 dollars, escalated dollars, and net present value dollars.

Assumptions relating to the scope and basis of the estimate have been included on the attached Recapitulation Sheet.

Should you have any questions, please contact Terry Sivill, ID-TES or 526-9273.

TES


F. L. Webber
January 4, 1999
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Attachments

cc: Estimate File 4951-4
B. J. Broomfield, MS 3921
T. E. Sivill File

A handwritten signature in cursive script, likely belonging to F. L. Webber, is written next to the distribution list.

COST ESTIMATE SUPPORT DATA RECAPITULATION

Project Title: WAG-5 FEASIBILITY STUDY ALTERNATIVE COST ESTIMATES
Estimator: T. E. SIVILL
Date: 1/04/99
Estimate Type: PLANNING
File: 4951-4
Approved By: 

I. **SCOPE OF WORK:** *Brief description of the proposed project.*

Provide revised Planning (Rough Order of Magnitude) Cost Estimates for the WAG-5 comprehensive feasibility study (FS). Air monitoring was deleted from the long-term surveillance and monitoring costs. Air monitoring will be done as a site wide activity and funded as a program cost. As a result of the remedial investigation and site screening process, the sites listed below have been identified for development of remedial alternatives:

SOIL SITES OPTION:

- ARA-01 CHEMICAL EVAPORATION POND
- ARA-12 RADIOACTIVE WASTE LEACH POND
- ARA-16 RADIOACTIVE CONTAMINATED SOILS
- ARA-23 WINDBLOWN SOILS
- PBF-16 SPERT II LEACH POND
- ARA-25 RADIOACTIVE CONTAMINATED SOILS/CONCRETE

ARA-02 SEEPAGE PIT AND ARA-16 RADIONUCLIDE TANK OPTIONS :

- ARA-02 SEEPAGE PIT
- ARA-16 RADIONUCLIDE TANK

Remedial action alternatives and associated scope/schedule/cost for each site are described in the assumptions below. Summary level costs have been prepared for comparative analysis and are presented in:

Current fiscal year 1998 dollars
Escalated dollars to the midpoint of remedial action activities
Present net worth dollars discounted at a rate of 5% as recommended under CERCLA guidance.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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II. **BASIS OF THE ESTIMATE:** *Drawings, Design Report, Engineers Notes and/or other documentation upon which the estimate is originated.*

The estimates were generated in conjunction with the editing of the draft FS. Costs were coordinated with cognizant engineering, technical personnel and performing cost estimators.

Preliminary site outlines/descriptions of FS document.

Coordination and status meetings with the cognizant Environmental Restoration engineers.

Conversations with performing organizations, e.g., LMITCO Environmental Affairs, Radcon Technicians, and Sample Management Office

D&D List, "INEL EM 40/60, Rad Contaminated Surplus Facilities."

Procurement Fee (Material Handling), General and Administrative (G&A), Productivity Incentive Factor (PIF) percentages were included as prepared by Program Controls and Financial Operations, "Planning Preparation Requirements", Rev. 4, dated October 3, 1997.

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III. **ASSUMPTIONS:** *Conditions statements accepted or supposed true without proof of demonstration. An assumption has a direct impact on total estimated cost.*

EXISTING SITE CONDITIONS

ARA-01 CHEMICAL EVAPORATION POND

- Shallow unlined surface impoundment; contaminated area is assumed to be 109 ft x 295 ft and 2 ft deep.

ARA-12 RADIOACTIVE WASTE LEACH POND

- ARA-12, ARA-III Cs-137 contaminated soil southwest of ARA-12 footprint of main contaminated area is approximately a 1 acre site with an average depth of 6 in. The main area is covered with tall vegetation.
- ARA-12, ARA-III Radioactive Leach Pond (Outlet) is approximately 60' x 38' with an average depth of 1 ft.

ARA-16 RADIONUCLIDE TANK

- Approximately 260 lf of 4" stainless steel underground piping from building to tank
 - Stainless steel tank 4' Dia. x 9' long, 1,000 gal. tank located 2'-6" below grade (to top of manway) and is set in an open top concrete vault on 6" of pit run.
 - The concrete vault is approximately 15'-6" x 7'-0" x 6'-0" D. Total depth varies as a result of the D&D Program's initial investigation of the tank. The depth from current grade to bottom of vault is approximately 7'-6" to 8'-6" deep.
- The soils within vault surrounding the tank have background levels of radiological contamination. No hazardous waste or any waste from the tank has leaked into the vault area.
- Contents are assumed to be approximately 100 gallons of sludge/liquid waste.
 - Radiation levels are assumed to be 4-6R within the tank and background levels outside the tank. Initial investigation of the tank indicates it is good condition.

ARA-23 WINDBLOWN SOILS

- Surface soils surrounding the ARA-I and ARA-II facilities
- Site footprint is approximately 58 acres with contamination to a an assumed maximum depth of 6"
- Currently ARA-I & II facilities are in the process of being demolished by the LMITCO D&D Program
- Vegetation and some surface lava rock exist across the site

PBF-16 SPERT II LEACH POND

- Shallow unlined surface impoundment; contaminated area assumed to be 3,000 ft² and 4.5 ft deep.

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ARA-25 RADIOACTIVE SOIL/CONCRETE SITE

Radioactive contaminated soils/concrete floor area is assumed to be 24 ft x 16 ft and 5 ft deep. D&D discovered contaminated soils and concrete under the ARA-626 Hot Cells during demolition of the ARA-I facility. The site was listed as a new site under CERCLA and the soils/concrete were sampled in September of 1998. Each hot cell had a drain pipe that fed the ARA-729 tank (ARA-16) which previously was found to contain a PCB contaminated listed mixed waste. The soils and concrete were assumed to have similar waste characteristics for the purpose of sampling and analysis. Unvalidated results indicate that the contamination is limited to radiological contaminants and metals. Since the source of contamination is unknown, but likely caused by activities in the hot cell, the contaminated areas were assumed to be a RCRA listed waste until sample results were obtained. Since the RCRA hazardous constituents were not found, it is assumed for the purposes of the FS and the cost estimates that: (a) a "no longer contained in determination" will be approved by the IDHW or the waste will be delisted in the ROD and the contaminated material will only be treated as radiologically and metal contaminated waste.

ARA-02 SANITARY SEPTIC TANKS AND SEEPAGE PIT

- 3 precast concrete septic tanks (chlorine contact tank, 2 septic tank battery) all approx. 6'x6'x5'
- 1 Manhole #3 approx. 4' dia. x 6' deep
- Underground piping system from facilities to Manhole #2 approx. 400 lf
- Pumice block leach pit 11' dia. x 10' deep (assumed with only 1 ft depth or less of sediment waste).

GENERAL PROJECT ASSUMPTIONS.

The present schedule for WAG 5 assumes the record of decision will be signed in Fiscal Year 1999. Remedial action activities are targeted for Fiscal Years 2001 through 2003.

WAG 5 has potential archeological concerns with all sites. An initial meeting was held with INEEL LMITCO archeology personnel, WAG 5 project management and cost estimating to develop an appropriate path forward. A preliminary cost/budget allowance has been included in all soil site alternatives based on the concurrence of all parties at the meeting.

INEEL site stabilization wages will apply, no overtime or shift differential has been considered for labor efforts reflected in this estimate.

No provisions were made for an 8-A set aside contractor. It is assumed that the job will be competitively bid within the local subcontracting or accomplished by LMITCO/Parsons personnel.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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FFA/CO costs encompass management oversight and coordination of initial planning activities, CERCLA documentation and permitting, remedial design, remedial action, and operations/maintenance including 100 years of long-term monitoring and institutional controls.

Program management duration was determined by the remedial action activity duration. Average effort was reflected as 1 full time equivalent (FTE) each year for the schedule duration at a burdened rate of \$125,000 per year per FTE.

Program management involvement for the operational maintenance, D&D, surveillance and monitoring period are assumed an average effort of 0.25 FTE for the scheduled duration. A burdened rate of \$125,000 per year per FTE or \$31,250 per year was used.

Cost allowances associated with program documentation and permitting are based on INEEL ER Cost Estimating Guide, Volume II, Environmental Restoration, August 1994. Cognizant in-house professionals were consulted where historical costs did not exist.

Existing institutional controls consist of legal and environmental affairs related to land and deed restrictions at the INEEL. It is assumed that all required land and deed restriction documents exist for all INEEL sites. Costs have been included for five-year reviews with the governing bodies and agencies to ensure existing restrictions meet current CERCLA compliance.

Assume that the WAG 5-year reviews will require 1 FTE each year for the first five years and 1 FTE (for a one year period) every (5) years thereafter.

Remedial design activities include a remedial design work plan, siting and surveying and a title design construction procurement document package will be developed to support remedial construction/remedial action activities. The title design construction procurement document package assumes in-house Title I (if necessary)/Title II engineering effort and design document preparation. Costs associated with the title design effort are based on historical data for construction projects on the INEEL sites. Title design ranges from 2% to 30% of each construction subcontract depending upon complexity.

Based on INEEL historical costs project management/construction management (PM/CM) construction support costs range from 15% to 30% of the construction subcontract costs. A typical breakdown is as listed below:

- Project Management at 5%/construction management at 10%
- Title III Inspection at 3% - design support during Construction at 2%

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Capital construction costs assume the remedial design/remedial action (RD/RA) subcontractor will award all construction and remediation work to the local bidding community. Only out-of-state vendors were identified in developing costs for treatment options (i.e., soil physical separation system and vitrification options). Costs associated with these treatment systems include mobilization and demobilization, minor training costs for off-site personnel, and systems operations testing to meet LMITCO and DOE-ID requirements.

Capital soils remediation costs are based on historical costs at INEEL. Crew sizes and equipment may vary per site or application; listed below is a general crew breakdown for soil excavation:

Typical subcontract excavation crew @ \$350/Hr.:

- Forman with Truck - \$47/hr
- Cat 613C with Operator - \$117/hr.
- Cat 12G Grader with Operator - \$99/hr
- Water Truck with Operator - \$55/hr
- Laborer - \$32/hr.

LMITCO typical support crew @ \$165/hr.

- Radcon Technician @ fulltime - \$50/hr
- Quality Assurance/Oversight @ 1/2 time - \$25/hr
- Project Engineer @ fulltime - \$65/hr
- Health and Safety @ 1/2 time - \$25/hr.

All 4 x 4 x 8 waste boxes and 55 gal. drums are assumed purchased through the LMITCO stores area.

Alternatives include soil treatment for disposal on and off the INEEL. Costs assume a physical separation process using a Segmented Gate System (SGS) with an assumed 50% volume reduction at all applicable sites. Physical separation process rates vary from 12 yd³ per hr to 30 yd³ per hr depending upon the type of radionuclides being detected. 15 yd³ per hr has been assumed for estimating purposes. It is assumed the current SGS technology will perform to INEEL specifications.

The Mixed Waste Storage Facility (MWSF) is currently at or near maximum storage capacity. As per PM direction it is assumed that space will be available during WAG 5 remediation activities. Currently there is not a fee to the generator for storage at MSWF. No costs have been included in the estimate.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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RWMC will be used for all radioactive waste storage and disposal. Currently there is not a waste generator fee for acceptance and storage. No costs have been included.

An allowance for sampling per site has been included in the estimate for the following:

- Concurrent with the remediation for verification of contamination depths during excavation activities.
- Satisfy waste acceptance criteria for on-Site and off-Site disposal options. It is assumed the on-Site repository would require a sample per 100 yd³. Off-Site disposal assumes a sample is required per railcar load or approximately 75 yd³ (assumed shipped in bulk).

It is assumed for on-Site and off-Site disposal that all waste will meet the waste acceptance criteria of the disposal facility.

ASSUMPTIONS SPECIFIC TO ALTERNATIVES 1&2 – SOIL SITES – NO ACTION, LIMITED ACTION, & PERTINENT SECTIONS OF ALL REMAINING ALTERNATIVES

The assumptions listed below are applicable to all remedial action soil sites:

No Action/Limited Action

- Existing and additional institutional controls consist of legal and environmental affairs relating to CERCLA documentation, permitting, and land and deed restrictions. It is assumed that all required land and deed restriction documents already exist for the INEEL. Costs have been included for five-year reviews with the governing bodies and agencies to evaluate current conditions with CERCLA compliance.

Limited Action may only include additional controls:

- Deed and regulatory restrictions limiting land-use, soil moisture management, and erosion control measures including surface water drainage control and diversion
- Limit of access including security, fencing, and markers
- Environmental monitoring (soil and/or groundwater as indicated)

No Action/Limited Action will include minimal site characterization samples performed during remedial action timeframe to confirm the contaminated area footprint. Sampling during the RA timeframe is also an allowance to answer any public concerns relating to verification of constituents, level of concentration, and specific contaminants that were initially identified during the RI/FS. Minimal sampling will continue during the surveillance and monitoring period.

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**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 3A – SOIL SITES
EXCAVATION, CONSOLIDATION (WITHIN WAG 5), AND
CONTAINMENT WITH NATIVE SOIL COVER**

SITE: ARA-01, ARA-12, ARA-16, ARA-23, PBF-16, & ARA-25

Assume soils and vegetation will be excavated to required depth in an open-air environment with machine excavation technique. A "first cut" across the site would be at a 2" depth to remove and segregate the vegetation and grasses as much as possible. Final excavation, for surface contamination sites, would allow removal of soils at the remaining depth required. Soil sites with contamination levels ranging from depths of 2 to 10 ft will require additional side slope excavation to meet safety requirements and to minimize soil sluff in the contaminated area.

Vegetation is assumed to be 10%-20% of the total excavated soil volume. It is assumed a wood chipper, or similar equipment will be used in an open-air environment. Sized vegetation shall be boxed in 2x2x2-ft cardboard containers that are accepted by the WERF incinerator. Currently, WERF is Program Funded, there is no charge to INEEL generators for treatment. WERF will dispose of all ash.

Soils shall be transported, consolidated and compacted over the remains of the ARA I & II facilities. An assumed size of 1000' x 500' x 2' deep has been used for estimating purposes. This location assumes that the contaminated soils existing within the cap location would remain in place.

It is assumed the ARA I & II facilities will be completely demolished by the INEEL D&D Program prior to remedial action activities.

The native soil cap shall be constructed with a 6'-0" minimum soil cover and vegetation covering the cap area. A security fence will be constructed around the cap with perimeter drainage sloping runoff away from the cap. Some site reclamation of borrow areas will be required.

Site maintenance, surveillance and monitoring has been included for a 100 year duration.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 3B – SOIL SITES
EXCAVATION, CONSOLIDATION (WITHIN WAG 5), AND CONTAINMENT
WITH ENGINEERED BARRIER**

SITE: ARA-01, ARA-12, ARA-16, ARA-23, PBF-16, & ARA-25

Soil excavation is the same as Alternative 3A. In lieu of the native soil cap an engineered cap is assumed constructed of the following layers:

8" - Gravel

12" - Cobble

8" - Gravel

24" - Riprap

Riprap material is assumed native to the INEEL Site Borrow areas and will be available at no cost to the project. The gravel and cobble will be purchased and delivered from Idaho Falls to site. Some site reclamation of borrow areas will be required.

**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 4A – SOIL SITES
REMOVAL AND DISPOSAL AT INEEL**

SITE: ARA-01, ARA-12, ARA-16, ARA-23, PBF-16, & ARA-25

Soils will be excavated, vegetation will be separated and soils will be transported to the proposed INTEC repository. It is assumed the repository will accept soils in bulk truck loads.

An acceptance fee of \$104/yd³ has been assumed based on direction from the INEEL-ER WAG 3 program. The waste acceptance criteria have not been developed for the on-Site repository. Current WAG 3 direction indicates soil sample/characterization will be required per 100 yd³.

On-Site disposal is assumed to be an INEEL site repository at INTEC. WAG 3 FS describes possible alternatives for repository needs and configurations. Soils are delivered in bulk to the repository. No additional costs, such as repository construction, operations, surveillance and monitoring, are included.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 4B – SOIL SITES
REMOVAL AND DISPOSAL OFF INEEL**

SITE: ARA-01, ARA-12, ARA-16, ARA-23, PBF-16, & ARA-25

Soils will be excavated, vegetation will be separated and soils will be transported to the INTEC railhead and loaded for off-Site disposal. It is assumed that the railhead and railcar loading facility will be in place and operating at INTEC during WAG 5 remedial action activities.

It is assumed that INEEL will have a current off-Site disposal contract in place.

It is assumed the off-Site disposal facility will accept soils in bulk loaded railcar loads.

It is assumed that a soil sample/characterization per railcar (70 ton) load will meet the waste acceptance criteria of the disposal facility.

Off-Site disposal costs may greatly vary. The breakdown listed below is an approximation of costs based on historical data from a Fiscal Year 1996-1997 project and under an existing contract with the Corp. of Engineers and DOE for off-Site disposal at Envirocare.

Transfer Railcars to Railhead & Load Railcar.....	\$ 60/yd ³
Engine Rental.....	\$ 25/yd ³
Freight/Demurage.....	;\$ 100/yd ³
Disposal Fee.....	\$215/yd ³
Total Cost.....	\$400/yd ³

Soils are hauled to INTEC for railcar loading. No costs are included for construction of any required railhead, material staging/loading equipment, equipment maintenance, or surveillance and monitoring.

No costs have been included for negotiation of new contracts and/or permitting associated with off-Site disposal facilities.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 5A – SOIL SITES
REMOVAL, EX SITU SORTING, AND DISPOSAL AT INEEL**

SITE: ARA-01, ARA-12, ARA-16, ARA-23, PBF-16, & ARA-25

Soils will be excavated, vegetation will be separated and soils will be transported to the proposed INTEC repository. It is assumed the repository will accept soils in bulk truckloads.

A physical separation treatment system (segmented gate system) averaging a 50% volume reduction is assumed for costing this alternative. A subcontractor will be required to provide and operate equipment on-Site. The following additional scope/costs will be included and operated by on-Site personnel:

- Equipment for sizing soils to meet the requirement of the segmented gate system - (bulk soil receiver, grizzly, and vibrating screens)
- conveyer feed section (from grizzly product to segmented gate system)
- trucks receiving clean or contaminated soils - (clean shall be spread back over the excavated area)

It is assumed the INTEC repository will accept soils in bulk truckloads.

An acceptance fee of \$104/yd³ has been assumed based on direction from the ER WAG 3 program.

Although the waste acceptance criteria have not been developed for the repository it is assumed that a soil sample/characterization will be required per 100yd³.

On-Site disposal is assumed to be an INEEL site repository at INTEC. WAG 3 FS describes possible alternatives for repository needs and configurations. Soils will be delivered in bulk to the repository. No additional costs such as for repository construction, operations, surveillance, and monitoring are included.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 5B – SOIL SITES
REMOVAL, EX SITU SORTING, AND DISPOSAL OFF INEEL**

Soils will be excavated, vegetation will be separated and soils will be transported to the physical separations unit.

The soil's physical separation treatment system (segmented gate system) capable of achieving a 50% volume reduction is assumed for costing this alternative. A subcontractor will be required to provide and operate equipment on-Site. The following additional scope/costs will be included:

- Equipment for sizing soils to meet the requirement of the segmented gate system - (bulk soil receiver, grizzly, and vibrating screens)
- conveyer section (from grizzly product to segmented gate system)
- trucks receiving clean or contaminated soils - (clean shall be spread back over the excavated area)

Separated contaminated soils transported in bulk to the INTEC railhead and loaded for off-Site disposal. It is assumed that the railhead and railcar loading facility will be in place and operating at INTEC during WAG 5 remedial action activities.

It is assumed that INEEL will have a current disposal contract in place.

It is assumed the off-Site repository will accept soils in bulk railcar loads.

It is assumed that a soil sample/characterization per railcar (70 ton) load will meet the waste acceptance criteria of the disposal facility.

Soils are hauled to INTEC for railcar loading. No costs are included for construction of any required railhead, material staging/loading equipment, equipment maintenance, or surveillance and monitoring.

No costs have been included for negotiation of new contracts and/or permitting associated with off-Site disposal facilities.

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ASSUMPTIONS SPECIFIC TO ARA-02 & ARA-16 - ALTERNATIVE 1 – NO ACTION AND ALTERNATIVE 2 LIMITED ACTION ARE THE SAME AS LISTED FOR THE SOIL SITES

Reference page 7 of this document. Alternatives 1 & 2 for sites ARA-02 and ARA-16 have been revised to show the remedial action alternatives independently. As per Project Management direction, the segregation of site ARA-02 RA Alternatives 1 & 2 now reflect a duplication of ARA-16 scope and costs. Previously, the cost estimates took advantage of the cost efficiencies of treating both sites as one.

ASSUMPTIONS SPECIFIC TO ARA-02 - ALTERNATIVE 3 - EXCAVATE WASTE TO TREATMENT AT THE WERF INCINERATOR AND FINAL DISPOSAL AT A SUBTITLE D OFF-SITE DISPOSAL FACILITY.

The remedial action scope of work includes 400 lf of underground waste pipe from existing building locations to manhole #2, 400 lf of underground waste piping to seepage pit, (2) manholes and a seepage pit. The top of the seepage pit is assumed 1'-0" below existing grade. Seepage pit area shall be excavated to a depth of 10'-0". Excavated soils around the pumice block walls are assumed free of contamination and will be used for backfill material.

The piping, manholes, and seepage pit shall be sized/boxed and transported to the INTEC railhead for off-Site disposal. The assumed dry contaminated material (seepage pit sludge) is assumed to be a maximum thickness of 1'-0" at the bottom of the seepage pit. The contaminated material shall be placed in drums and transported to WERF for treatment. The ash byproduct shall be collected, containerized, and sent to a Subtitle D off-Site disposal facility. Existing excavated and native soil from the immediate area shall be used to backfill the pit area.

ASSUMPTIONS SPECIFIC TO ARA-02 - ALTERNATIVE 4 – STABILIZATION AND ENCAPSULATION.

The remedial action scope of work includes grouting 400 lf of underground waste pipe from existing building locations, 400 lf of underground waste piping to seepage pit, (2) manholes and a seepage pit.

It is assumed all soil excavation for access to piping, manholes and seepage pit will be done in a temporary tent enclosure. All excavated soils are assumed clean of contamination and can be reused for backfill material.

All excavated areas will be reseeded with natural vegetation.

Fencing and signs will be place around all piping and manholes.

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Ten 2" dia. boreholes will be drilled to bedrock or to a maximum depth of 15'-0" below existing grade. The boreholes will be used for long term monitoring and maintained for a 100 year duration.

**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 3A - TANK SITE - ARA-16
SITE ISV OF THE ARA-16 TANK AT ARA-16 WITH NATIVE SOIL COVER**

Assume approximately 260 lf of 4" SST pipe buried an average of 3'-0" below grade routed from facility to tank. Open air machine excavation is assumed acceptable for removal action. Piping shall be sized and boxed inside a temporary 8' x 8' tent enclosure and transported to RWMC. Excavated soils are assumed clean and will be returned to trench area.

Tank shall be filled in place with native soil inside a secondary enclosure with temporary shielding. It is assumed a secondary containment will be a portable fabric structure. Temporary lead curtains will be used for shielding.

Native soil in the immediate area shall be used as overburden soils to fill to existing grade.

The native soil cap shall be constructed with a 6'-0" minimum cover and vegetation covering the one acre area. A security fence will be constructed around the cap with perimeter drainage sloping runoff away from the cap. Some site reclamation of borrow areas will be required.

Site maintenance, surveillance and monitoring has been included for a 100 year duration.

**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 3B1 - TANK SITE - ARA-16
SITE REMOVAL AND ISV OF THE ARA-16 TANK AT TEST AREA NORTH
(ISV BY WAG 1 AT TAN)**

Existing 4" SST underground piping shall be removed, boxed, and transported to RWMC.

It is assumed that the 1,000 gal. tank will be removed within a temporary secondary enclosure.

The area around the concrete vault will be excavated and assumed clean. Soils inside the vault will be machine/hand excavated and assumed to have background levels of radiological contamination. Vault walls will be decontaminated, demolished, containerized in 4x4x8 boxes and transported to RWMC.

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The tank is assumed in very good condition based on prior studies. The tank exterior shall be decontaminated for transport. Tank shall be loaded onto flatbed, in a shielded vault, and transported to INEEL - TAN during off-shift hours. The roadways required for transport will be closed to through traffic with signs and posted personnel.

It is assumed there is an easily accessible location free of underground interference's to locate the tank near the existing V-Tanks below grade.

It is assumed WAG 5 will share in the ISV costs with WAG 1. A cost allowance was included in the estimate based on a ratio of total tank volumes of the V-tanks at TAN vs the ARA-16 tank. The volume percentage was applied against the ISV treatment costs to establish the cost allowance. This allowance should be considered a placeholder until further scope definition and coordination takes place between the WAG's.

The remediated site within WAG 5 shall be backfilled, compacted and vegetated.

**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 3B2 - TANK SITE -
ARA-16 SITE ISV OF THE ARA-16 TANK WASTE AT TEST AREA NORTH-
(REMOVE TANK, DECON, AND DISPOSE)**

Existing 4"SST underground piping shall be removed, boxed, and transported as indicated in alternative 2A.

It is assumed that the 1,000 gal. tank will be removed within a temporary secondary enclosure and lead curtain shielding.

The area around the concrete vault will be excavated and assumed clean. Soils inside the vault will be machine/hand excavated and assumed to contain background levels of radiological contamination. Vault walls will be decontaminated, demolished, containerized in 4x4x8 boxes and transported to RWMC.

Capital equipment shall be purchased for mixing and pumping of tank contents into 55-gallon drums.

Drums shall be loaded into a shielded cask and transported by truck to INEEL - TAN during off-shift hours. The roadways required for transport will be closed to through traffic with signs and posted personnel. The secondary structure and pumping equipment shall be relocated to TAN. Tank contents shall be pumped into one of the existing V-Tanks.

It is assumed WAG 1 is willing to assume all responsibility for the tank contents for any further remedial action required at no cost to WAG 5.

COST ESTIMATE SUPPORT DATA RECAPITULATION

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The tank shall be decontaminated, sized and disposed at CFA Landfill as clean waste.

The remediated site at WAG 5 shall be backfilled, compacted and vegetated.

ASSUMPTIONS SPECIFIC TO ALTERNATIVE 4 – ARA-16 SITE: REMOVAL, EX SITU THERMAL TREATMENT, AND DISPOSAL

Existing 4"SST underground piping shall be removed, boxed, and transported as indicated in alternative 2A.

It is assumed that the 1,000 gal. tank will be removed within a temporary secondary enclosure and lead curtain shielding.

The area around the concrete vault will be excavated and assumed clean. Soils inside the vault will be machine/hand excavated and assumed to have background levels of radiological contamination. Vault walls will be decontaminated, demolished, containerized in 4x4x8 boxes and transported to RWMC.

Capital equipment shall be purchased for mixing and pumping of tank contents into 55 gal. drums.

Drums shall be loaded into a shielded cask and transported by truck to INEEL - RWMC during off-shift hours for temporary storage. The roadways required for transport will be closed to through traffic with signs and posted personnel. An acceptance fee has been included for temporary storage and transport to AMWTF.

It is assumed that treatment will be available at the Advanced Mixed Waste Treatment Facility (AMWTF) during the WAG-5 remediation process. No costs have been included for long-term or temporary storage at RWMC. It is assumed that waste will meet the AMWTF waste acceptance criteria. A projected unit cost for treatment has been provided by BNFL for waste that meets their WAC. No costs have been included for any waste pretreatment systems to meet the AMWTF WAC or for any modifications to the AMWTF facilities/systems to accommodate the waste should it not meet the WAC.

The tank shall be decontaminated, sized and disposed at CFA Landfill as clean waste.

The remediated site treatment equipment and facility shall be decontaminated and dismantled. The tank site shall be backfilled with surrounding native soil, compacted and vegetated.

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**ASSUMPTIONS SPECIFIC TO ALTERNATIVE 5 – ARA-16 SITE:
EXCAVATION, REMOVAL, STABILIZATION OF WASTE FOR OFF-SITE
DISPOSAL.**

Existing 4"SST underground piping shall be removed, boxed, and transported as indicated in Alternative 2A.

It is assumed that the 1,000 gal. tank will be removed within a temporary secondary enclosure and lead curtain shielding.

The area around the concrete vault will be excavated and assumed clean soil. Soils inside the vault will be machine/hand excavated and assumed to have background levels of radiological contamination. Vault walls will be decontaminated (as much as possible), demolished, containerized in 4x4x8 boxes and transported to RWMC.

Capital equipment shall be purchased for mixing, pumping, and grouting of tank contents into 55 gal. drums.

Drums shall be loaded and shipped to an offsite disposal facility.

The tank shall be decontaminated, sized and disposed at CFA Landfill as clean waste.

The remediated site treatment equipment and facility shall be D&D. The site shall be backfilled, compacted and vegetated.

It is assumed the stabilized waste will meet the off-site disposal facility waste acceptance criteria.

No costs have been included for new permits or contracts with an off-site disposal facility.

COST ESTIMATE SUPPORT DATA RECAPITULATION

- Continued -

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IV. CONTINGENCY GUIDELINE IMPLEMENTATION: *The percentage used for contingency as determined by the contingency allowance guidelines can be altered to reflect the type of construction and conditions that may impact the total estimated cost.*

Time constraints, minimal scoping, and lack of design have been taken into consideration in generating the costs in the attached detail sheets.

Maintaining conformance with standard Environmental Restoration Program Procedures neither contingency and/or Management Reserve have been included within the body of the estimate. At the final summary level, an average overall project contingency of 30% has been reflected as a separate line item.

Standard Cost Estimating practice for Environmental Projects would recognize contingency within a range of -30% to +50% at this phase of planning. The possibility for changes in scope, selected remedial technology, waste characterization/acceptance criteria and project definition present risks that should be considered as potential impacts to the cost at this early stage of project development.

V. OTHER COMMENTS AND CONCERNS SPECIFIC TO THE ESTIMATES

The cost estimates show Life Cycle Costs for WAG 5 as a stand-alone project from signature of the ROD to the end of surveillance and monitoring of the WAG. It presents the costs in a format consistent with the level of detail and approach for all sites. The format allows the cost estimate to be traceable to previous scope and schedule documentation. It facilitates comparison between alternatives within WAG sites and the WAG as a whole project. The cost estimate, details cost and scope assumptions for RD/RA at 7 sites: CERCLA permitting and documentation, design, construction, operations, facility demolition, surveillance and monitoring, and program and project management.

The selected/preferred alternatives will be incorporated as a single inclusion to an overall WAG-5 project proposed plan. The estimates should be reviewed for efficiencies in project support, documentation, and surveillance and monitoring costs.

Current business practices require the following adders be applied to each alternative: RD/RA subcontractor fee, general and administration, procurement fee/material handling fee, and productivity incentive fee. As alternatives are selected, the above listed adders should be evaluated to maintain optimum cost efficiencies.